it is Herr Exner, or all the authorities on thermo-electricity from Seebeck to Tait, on whom we are to rely for the facts.

IN a new capillary electrometer described by M. Debrun in the *Journal de Physique* (May), the microscope is dispensed with, and the requisite sensibility obtained by inclining the tube, which is slightly conical. The capillary tube is bent into a somewhat zig-zag shape, the two turned-up ends opening into larger tubes, and with the mercury in these wires are connected. The support can be turned in a vertical plane, so as to give the middle part of the capillary tube any desired inclination.

M. CROVA commends, for photometric purposes (*Journal de Physique*, May), M. Prazmowski's polariser, which is a Nicol, with faces normal to the axis of the prism, the two halves of which are joined with linseed oil. It requires large pieces of spar, and the joining is long and difficult, but there are several advantages. Thus the layer of oil (unlike Canada balsam), causes hardly any loss of light; its index, 1·485, being nearly equal to the extraordinary index of spar, the polarised field is limited on one side, as in Nicols, where the total reflection of the ordinary ray commences, by a red band; but these cond limit, corresponding to total reflection of the extraordinary ray, is thrown out of the field of vision; the angular value of the polarised field is thus increased. The increase of field, the angular separation of the only coloured band, and the direction of its bases, normal to the axis, are qualities to be appreciated in certain cases.

ACCORDING to some recent experiments of M. Goulier, the coefficient of expansion by heat of a metal is independent of any pressure put upon the metal, and is the same under a stress of traction as under one of compression.

MR. W. P. JOHNSON gives an account in the *Philosophical Magazine* of a new use of the telephone. It is sometimes necessary to grapple and lift a faulty cable, and if it lies in the water along with other cables of similar exterior make it has hitherto been impossible to decide, without cutting it apart, on the identity of the grappled portion. To avoid the obvious evil of having to cut and splice the cable unnecessarily, it is now suggested to employ the telephone on an auxiliary parallel wire in which the induction may be sufficiently strong to enable the electricians in charge to read the signals which may be sent into the cable, and so identify it.

THE following pretty experiment, devised by Mr. R. H. Ridout, illustrates the surface tension of mercury. A shallow tray, six inches by three, is supported on three levelling screws, and inclined just so that the mercury does not flow over the lipped edge. If now a small quantity of the liquid be set flowing over the edge it will draw the rest of the liquid over with a siphon-like action. It is difficult, however, to get the surface so clean that no adherent trail should be left, marring the completion of the experiment.

THE expansion of glass by heat may be demonstrated as follows:—A glass tube of narrow bore and about eighteen inches long is bent round in the shape of a horse-shoe, so that the free ends are within a millimetre of one another. Between these ends a coin may be held, being nipped between the ends of the rod and held there by the grasp due to the elasticity of the glass. If now the *outer* portion of the curved part be warmed, the ends open slightly and the coin drops out. This experiment is also due to the ingenuity of Mr. Ridout.

THE phenomenon lately discovered by Hall of the action of a magnet in altering the path of a current of electricity in the conductor which carries it, has formed the starting-point for two investigations, which have appeared separately in the *Wiener Anzeiger*, by Boltzmann and von Ettingshausen respectively, in which they point out that this discovery may be applied to determine the absolute velocity of electricity in a conductor.

M. LOUGHININ has published in the last fascicule of the *Journal* of the Russian Physical and Chemical Society (vol. xii., fasc. 4) a note on his important work on the heat which results from the burning of several alcohols. The substances experimented on are burnt in a jet of oxygen in a glass vessel which is placed in the water of a calorimeter. The figures are: For normal propylic alcohol, 481·6 calories for one molecule; isopropylic alcohol, 479 calories; isobutylic alcohol, 638·6 calories.

GEOGRAPHICAL NOTES

MR. CARL BOCK has lately returned to London after his journeys in Borneo, bringing with him a magnificent series of portraits of the native tribes of that island,—both Dyaks and forest people—taken in water colours. These, we understand, are to be reproduced, at the expense of the Dutch Government, by chromolithography, and will illustrate his report on the journey, which is to be read in the first instance before the Royal Geographical and Anthropological Society of Holland. Pending the publication of this report, Mr. Bock refrains, at the desire of the Dutch Government, from anticipating it in England even by a preliminary sketch. The varieties of type, the methods of adornment, the manner, and to some extent the religion of these distinct races, are all brought out in Mr. Bock's faithful drawings taken from the life on the spot, which form, over and above the objects for which the journey was taken, a splendid contribution to ethnography, the publication of which will be looked forward to with interest; the greater perhaps if Mr. Bock were permitted to give some further slight outline than has already appeared in the pages of NATURE. Mr. Bock has also made an extensive collection of the swords, lances, blowing tubes, and shields (some of the latter covered with human hair), which are used by the natives. He seems to have had the happy knack of making friends of the savages whom others have found murderers, and has brought himself back alive to receive the honour that is his due.

THE current number of the Geographical Society's *Proceedings* opens with the Rev. C. Maples' very interesting paper on Masasi and the Rovuma district between Lake Nyassa and the east coast of Africa. The Rev. C. T. Wilson's and Mr. Felkin's brief notes on Uganda and the journey through the Nile region are also published, and are followed by an account of that rare occurrence in Dominica, a volcanic eruption at the Grand Souffrière, which took place on January 4. The geographical notes include a list of latitudes in Central South Africa, Mr. F. C. Selous' explorations on the Zambesi, &c. (of which full accounts are to be published in a later number), and a journey in Damara-land and beyond the River Okavango. An allusion is also made to Mr. Whymper's ascent of Cotopaxi, and to a proposed exploration of some of the unknown affluents of the Purûs. Among the remaining notes is a long account of the country of the Mijjertain Somalis, and of recent exploration in Central Australia. Col. H. Yule furnishes an obituary notice of General Macleod, whose pioneer journey into the interior of the Indo-Chinese Peninsula in 1836-7 is, we fear, now almost forgotten. The map this month is that of the central portion of South Africa, illustrating Dr. Emil Holub's journeys, and constructed in part from his original drawings.

DR. EMIL BESSELS, who was with Hall in the *Polaris*, hopes to undertake a new Arctic expedition in 1881 on funds subscribed in America. He will establish a station at the entrance of Jones Sound, where a scientific staff will be located, consisting of an astronomer, a physicist, a geologist, botanist, and zoologist. Intercourse will be kept up with the settlement of North Greenland by means of a yacht, as well as with the whalers.

SIGNOR CRISTOFORO NEGRI, President of the Italian Geographical Society, and member of the Geographical Society of London, has just published an interesting pamphlet at Genoa, in which he warmly advocates the proposed Italian Antarctic expedition. He demonstrates the importance not only to science, but probably also to trade, of such an expedition. A special circumstance increases the desirability of this Italian Antarctic expedition. In 1882 the transit of Venus will again occur, but after that not again for a hundred years. The Italian expedition, therefore, finding itself in 1882 at some point of the Antarctic circle, would be able to observe this phenomenon under favourable conditions. Signor Negri believes that the expedition might be made with a single vessel at no very extravagant cost, perhaps 600,000 to 700,000 Italian lire. It would spend two winters, returning to La Plata, if necessary, during that period, to re-provision and re-coal the ship.

AT the last meeting of the Russian Geographical Society the Secretary intimated that M. Potanin continues his exploration of North-Western Mongolia. The Society has just received from him a part of his collections, and expects soon to receive his detailed report. M. Tiaghin, who stays on Novaya Zemlya for the exploration of that island, has brought together a very good collection of plants, and has made interesting communications as to the geography of the island. As to new expeditions, the Society proposes to send M. Mereshkovsky to the Crimea for ethnographical and archæological explorations, and M. Malakhoff to the Middle Ural Mountains for zoo-geographical investiga-

tions. M. Maikoff presented a report of the Committee appointed to discuss the subject of a thorough historical and ethnographical exploration of Bulgaria. Col. Lebedeff presented a sketch of the orography of the Balkan peninsula, according to the last geodetical and topographical operations in Bulgaria by officers of the Russian General Staff. The orography of much of the Balkan peninsula has been pretty well studied, a complete trigonometrical report having been completed, and a relief-map on a large scale, like that of the Caucasus, is now in preparation.

A LIVELY controversy having arisen between the cantons of Geneva and Vaud as to the importance of the dam erected at Geneva with reference to the level of Lake Leman, the *Journal de Genève* has published during the past month a series of papers by M. H. de Saussure on Lake Leman, the changes of its level, the destructive action of its waves, and generally on its physical conditions. These papers have a great scientific value. We notice also several papers on the same subject published by the *Gazette de Lausanne* in answer to M. de Saussure's articles.

WE notice an interesting note by MM. Polonsky and Meyer on that part of the eastern shore of the Caspian which is described as Tentiak-sor, and is a former lake now transformed into a series of lagoons separated by muddy spaces. Its origin is explained by M. Meyer by a falling of level of the Caspian. Prof. Lenz having made an incision in a rock at Baku in 1830, the subsequent measurements showed that the level stood—in 1837, 1·6 feet lower; in 1847, 0·7 feet higher; in 1848, 1·3 foot; in 1852, 2·9 feet; in 1853, 2·5 feet; and in 1861, 3·9 feet lower than in 1837. This circumstance would be in complete accord with the general diminution of water in all Asiatic lakes, and would perfectly explain a multitude of important physico-geographical phenomena.

HEFT V. of *Petermann's Mittheilungen* begins with an article by C. Marten, on the Inhabited Part of Chili South of the River Valdivia; Dr. Behm gives some collected information on the gold-fields of Wassa, on the Upper Ankobra, north from the Gold Coast; Dr. Junker narrates his journey through the Libyan Desert to the Natron Lakes; and Herr Bernhard von Struve writes on the history of trade-routes in East Siberia. The Ergänzungheft No. 61 consists of a physico-geographical account of the Portuguese Mountain group, the Serra da Estrella, with special reference to its forestal conditions, by Herr J. Rivoli. In the June number Dr. A. Regel gives an interesting account of a visit he made last year to Turfan, in Central Asia. Dr. Emin-Bey describes his journey from Dufilé to Fatiko in December, 1878, and January, 1879. Herr Lindemann gives some statistical information on the forests of Bavaria in connection with a map of the Bavarian Spessart. Herr E. R. Flegel gives a detailed narrative of his journey in the *Henry Venn* in July and August last year, up the Binué, from Gandé to Djen.

THE *Japan Mail* states that development in the trade between Japan and Corea is confidently anticipated in consequence of the opening of the port of Gensan. The Japanese residents at Fusan, in the south of the Corean peninsula, are said already to exceed 14,000 in number, and we may therefore hope that we shall soon have more detailed information regarding the interior of the country than has hitherto been accessible.

THE Melbourne correspondent of the *Colonies and India* states that Mr. White, of the Reed Beds, near Adelaide, has fitted out the schooner *Elsea*, and has left on an exploring cruise to New Guinea for the purpose of making natural history investigations, which are expected to occupy two years.

IN the introduction to his lately published report on the trade and commerce of the Caucasian Provinces, Mr. Lyall, H.B.M.'s Consul for Tiflis and Poti, gives a succinct account of the geographical features of this region, accompanied by remarks on its climate, resources, communications, &c. Though the information is not perhaps entirely new, it is interesting to be able to take in at a glance so much relating to a tract of country which is daily becoming more and more important.

COL. FLATTERS, who had left Wargla on March 15 with a column of 100 men for an exploration in connection with the intended Trans-Algerian Railway, returned to Wargla on May 20, after having travelled 600 miles in the direction of Raof, without meeting any opposition from the natives. He intends to resume his explorations in the months of September or October, in another direction. He was unable to discover the Ighorghor Wed, which is marked on every map.

FROM August 5 to 10 next the French Geographical Society will meet at Nancy for their triennial meeting.

WE have received Parts 12 to 16, each containing three maps, of the new edition of Stieler's "Hand-Atlas."

THE Russian Department of Estates has just published an interesting atlas of six maps, representing the distribution of soils in Russia. The atlas is accompanied by a text by M. Dokoutchaeff. The maps were drawn five years ago by M. Tchaslavsky, who has studied this subject during many years.

THE ROYAL OBSERVATORY

THE following are the points that seem to us of most interest in the Report of the Astronomer-Royal to the Board of Visitors at their recent Visitation:—

The Admiralty have decided not to proceed with the erection of a new library at present, though the space has been cleared, admitting of the erection of a building fifty by twenty feet. The Astronomer-Royal proposes to erect here a room of one story, but with galleries at mid-height, so that there would never be need to use a ladder. Among other changes occurring in this clearance, he has removed the electrometer mast (a source of some expense and some danger); the perfect success of Sir William Thomson's electrometer rendering all further apparatus for the same purpose unnecessary. With regard to the library the Report states that no change has been made in plan, but in some departments the number of books has increased rapidly. "Fundamental astronomy advances slowly, magnetism is almost stationary, geodesy progresses, photography and spectroscopy increase very fast, and meteorology the most rapidly of all. The Transactions of foreign Academies increase in number. This is owing, I imagine, to the general scientific activity, both of Academicians and of private men of science, in most foreign countries, and to the facilities given for transmission, by the courtesy of publishers and by the extension of book post."

Under the head of Astronomical Observations, the Report says: "The sun, moon, planets, and fundamental stars are the regular subjects of observation on the meridian, special attention being devoted to the moon, which is also observed at every available opportunity with the altazimuth. Other stars are observed from a working catalogue of about 2,500 stars, with which good progress has been made in the past year, though a large number of stars still remain for observation. About 1,100 stars were observed in 1879." Between May 20, 1879, and May 9, 1880, the following observations were made:—With the transit circle 4,164 transits, the separate limbs being connected as separate observations; 3,953 circle-observations; with the reflex-zenith tube, 23 pairs of observation of γ Draconis; with the altazimuth, 713 azimuths of the moon and stars and 352 zenith distances of the moon. A set of micrometer-measures of the outer satellite of Mars and several sets of measures of the satellites of Saturn, were obtained last autumn with the south-east equatorial, and a few drawings of Mars and Jupiter were made near the time of opposition. A remarkable proof of the exceptionally bad weather of last summer is found in the fact that in July it caused the loss of a whole month's observations of the sun.

Under the heading of Spectroscopic and Photographic Observations we find the following statement:—"The sun's chromosphere has been examined on thirty-seven days during the period to which this Report refers, and on thirty-four days prominences were seen. Whenever practicable, the appearance of the prominences as seen on each of the chromospheric lines has been recorded, and on four days a detailed examination of the whole spectrum of the chromosphere was made at twenty-four points of the sun's limb. Three sun-spots have been examined with reference to the broadening of lines in their spectra, and fifteen photographs have been taken of the spectra of three sun-spots. As regards the spectroscopic determination of star-motions, 113 measures have been made of the displacement of the F line in the spectra of 29 stars, 44 of the b_1 line in 19 stars, and 6 of the b_4 line in 3 stars. Of these 51 stars 21 had not previously been examined. In the case of three of the stars a dispersive power equivalent to that given by fifteen prisms of 60° was used. The stars are taken from a working list of 150 stars, which may eventually be extended to include all stars down to the fourth magnitude, and it is expected that in course of time the motions of about 300 stars may be spectroscopically determined. The spectra of comets *c* (Swift's) and *d* (Palisa's)